REMARKS

The application has been amended to place the application in condition for allowance at the time of the next Official Action.

The specification is amended to include section headings.

Claims 51-76 are pending in the application.

Claim 66 is amended to provide proper antecedent basis for the recited "recess" to address the 35 USC §112, second paragraph rejection noted in the Official Action. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

Claims 51-54, 57, 58, 60, 61, 64, 65, 67, 68, 70-72, 75 and 76 were rejected under 35 USC §102(b) as being anticipated by KIMURA 5,224,714. That rejection is respectfully traversed.

Independent claim 51 recites at least two surfaces that face each other and define at least one point of closest engagement between the surfaces. Diverging gaps extend between the surfaces on either side of a plane which contains the at least one point of closest engagement and which extends generally orthogonal to the direction of relative rotation.

KIMURA fails to disclose diverging gaps extending on either side of a plane that contain the at least one point of engagement.

Rather, as seen in Figures 3 and 4 of KIMURA, there is only one gap, i.e., the wedge-shaped gap between surface 31 and the adjacent surface of sealing ring 4.

As KIMURA does not disclose each of the recited features, KIMURA does not meet the present claims.

The dependent claims are believed patentable at least for depending from an allowable independent claim.

Independent claim 75 recites a radial sealing surface for forming, with a further radial sealing surface, a radial seal to separate internal and external pressure areas. The radial location of the seal is selected such that the pressure applied by the internal and external pressure areas to the radial sealing surface is substantially balanced by at least the internal and external pressures applied to respective pressure-balancing surface opposing the radial sealing surface.

Such a configuration is consistent with a seal having diverging gaps extending between the surfaces on either side of a plane which contains the point of closest engagement. By such a configuration, fluid moving to or from internal and external pressure areas is presented with a wedge-shaped inlet and a wedge-shaped outlet. This has the effect of balancing fluid pressure on either side of the points of closest contact. As fluid enters the inlet diverging gap, the dynamic energy of the fluid flow is converted to pressure energy that lifts the second

portion. The presence of the outlet diverging gap assists with this balancing.

KIMURA fails to disclose that the radial sealing surfaces is substantially balanced by at least the internal and external pressures applied to the respective pressure-balancing surface opposing the radial sealing surface.

Rather, in KIMURA, one seal element has a flat face while the other has an inclined section 31. Downstream of section 31, there are two parallel faces. Since these faces are parallel, they do not form a diverging gap. The purpose of the gap in KIMURA's arrangement is to avoid uncertain velocity changes and thereby reduce leakage of fluid from a high pressure side to a low pressure side. See column 1, lines 5-11. There is no suggestion in KIMURA that the radial sealing surface is substantially balanced by at least the internal and external pressures applied to respective pressure-balancing surface opposing the radial sealing surface. Accordingly, claim 75 is also believed to define over KIMURA.

Independent claim 76 is amended to include the diverging gaps extending between the surfaces on either side of a plane which contains the at least one point of closest engagement and which extends generally orthogonal to a direction of relative rotation. The analysis above regarding claim 51 is equally applicable to claim 76 as to this feature. Accordingly, claim 76 is also believed to define over KIMURA.

Claims 55, 56 and 69 were rejected under 35 USC §103(a) as unpatentable over KIMURA in view of IDE 4,738,453. That rejection is respectfully traversed.

IDE is only cited with respect to features of the tiles. IDE does not overcome the shortcomings of KIMURA set forth above with respect to claim 51. Since claims 55, 56 and 69 depend from claim 51 and further define the invention, the proposed combination of references does not meet the present claims.

Claims 51-53, 57-60 and 62-65 were rejected under 35 USC §103(a) as being unpatentable over GARDNER 3,499,653 in view of KIMURA. That rejection is respectfully traversed.

At least Figures 1 and 3 of GARDNER show a first portion 12 having a straight surface and another portion 14 having a slightly convex surface that becomes straight towards its lower end. GARDNER fails to disclose diverging gaps extending between the surfaces on either side of a plane which contains the at least one point of closest engagement as recited in claim 51.

Rather, in GARDNER, there is only one diverging gap at the "inlet" area of the sealing surface. GARDNER does not disclose or suggest a gap at the "downstream" area at the point of closest contact.

As set forth above, KIMURA also fails to disclose a diverging gap extending between the surfaces on either side of a

plane which contains the at least one point of closest engagement.

Moreover, KIMURA could not suggest such gaps. The gaps of the present invention are used to generate the balancing forces that hold the surfaces in equilibrium once the gap has been formed. See, for example, claim 75.

In KIMURA, the generally cone-shaped gap at the inlet is not used for the same purpose and it is merely one example of how the device of KIMURA might be shaped. See alternative embodiments in Figures 6 and 7(b) of KIMURA.

Moreover, Figure 5 of KIMURA appears to indicate that the major pressure drop between the discs occurs at the radii r1 and rg. This is the area where the back pumping grooves are situated and there appears to be only a small pressure change in the disc area outside this inner region. This suggests that the "frusto-conical" area is not contributing significantly to the performance of the seal. Therefore, even if one were to consider the combination of GARDNER and KIMURA in the first instance, the proposed combination of references does not meet the present claims.

Claims 73 and 74 were rejected under 35 USC §103(a) as being unpatentable over KIMURA in view of IDE and further in view of GARDNER. That rejection is respectfully traversed.

Claims 73 and 74 depend from claim 51 and further define the invention. As set forth above, the proposed

combination of KIMURA, IDE and GARDNER does not meet claim 51. Accordingly, claims 73 and 74 are believed patentable at least for depending from an allowable independent claim.

Claim 66 was rejected under 35 USC §103(a) as being unpatentable over KIMURA. That rejection is respectfully traversed.

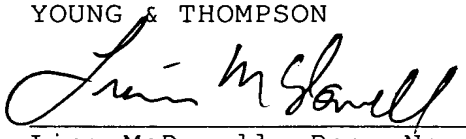
Claim 66 depends from claim 51 and is believed to define over KIMURA at least for depending from an allowable independent claim.

In view of the present amendment and the foregoing remarks, it is believed that the present application has been placed in condition for allowance. Reconsideration and allowance are respectfully requested.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 25-0120 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

YOUNG & THOMPSON



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